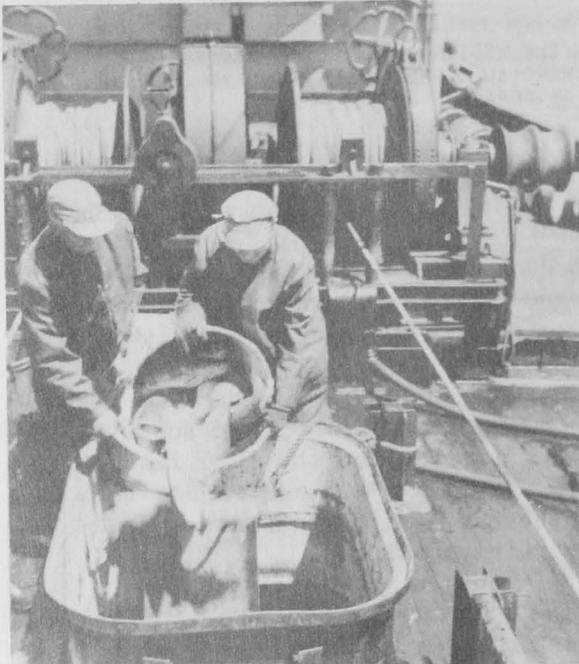


RESEARCH

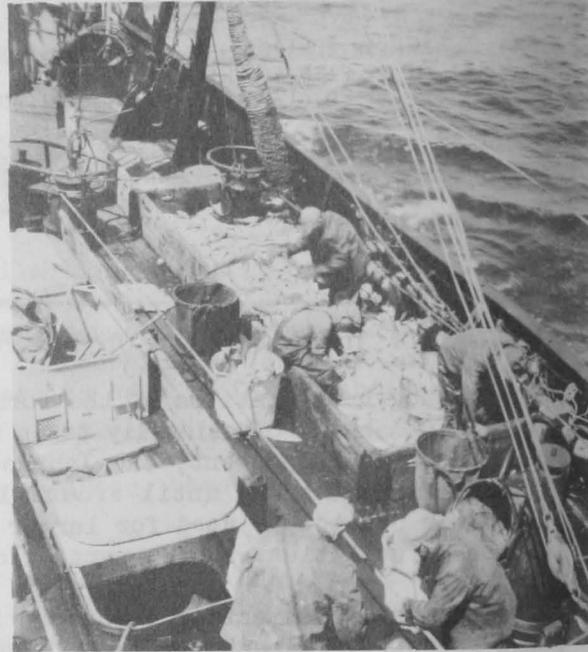
IN SERVICE LABORATORIES

May 1952

REFRIGERATION: Freezing-Fish-at-Sea, Defrosting, Filletting, and Refreezing the Fillets: The research trawler Delaware returned to East Boston on May 12 from test cruise No. 7 with approximately 12,000 pounds of haddock. Half of the



FEEDING FISH ONTO CHUTE LEADING TO BRINE-FREEZER AREA ABOARD THE DELAWARE.



SORTING FISH ABOARD THE RESEARCH TRAWLER DELAWARE.

fish was brine-frozen in the round at sea; the remaining half was packed in ice in accordance with normal commercial practice. Part of the frozen fish was processed in a local plant in order to obtain data on fillet yields. Another part of the frozen fish was placed in cold storage and will be used to study the effects of prolonged storage of the round frozen fish on quality of the fillets, prepared by thawing these whole fish, filletting, and refreezing the fillets. The remainder of the fish is being used for dockside tests of the refrigeration equipment. (Boston)

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Freezing Shrimp at Sea--Gulf States Area: A study was initiated on the handling and freezing of shrimp at sea. Preliminary field studies were carried out in the Gulf States area using the facilities of the Service's exploratory fishing vessel Oregon. The purpose of the study is to develop practical methods of handling shrimp aboard vessel in order to provide fresh or frozen shrimp of consistently good quality.

The Chief of the Fishery Products Laboratory, Ketchikan, Alaska, was detailed to carry out this study. Preliminary field work of two months duration was completed in the Gulf of Mexico aboard the Oregon. Samples of shrimp frozen at sea and ashore have been shipped to the Ketchikan (Alaska) laboratory for storage and quality comparison.

The work to date indicates that the application of brine-freezing at sea shows promise. Both whole and headless shrimp were frozen at sea in brine at temperatures of 0° to 10° F. and stored in air at 0° F. Examination after 4 weeks of storage indicated that the color, flavor, and texture of the brine-frozen shrimp were equal to shrimp packaged and frozen in air (-20° F.) at sea. Further storage tests must be completed to determine whether adverse flavor and texture changes occur in brine-frozen shrimp stored in air at 0° F.

Samples held in brine at 5° F. for periods up to 48 hours will be analyzed to determine the amount of salt absorbed by the shrimp. Also, shrimp which have been held in ice according to present commercial practice and then frozen in air at -20° F. will be tested in the laboratory.

Studies of shrimp-handling methods aboard the Oregon included tests on icing procedures and the effects of holding shrimp on deck prior to icing. Observations confirmed the belief that shrimp deteriorate very rapidly if allowed to stand on deck exposed to sun, air, and warm temperatures. To prevent this deterioration whenever delays aboard vessels do not permit icing of the shrimp immediately after catching and sorting, the use of an ice-water chilling tank aboard the vessel is suggested. Shrimp could be sorted directly into the chilled sea-water, then when time permits they could be taken from the chilling tank, heads removed and iced in the hold in the usual manner. There is no question that the quality of the shrimp suffers greatly if immediately after "decking" prompt chilling or icing is not carried out aboard vessel. In icing the shrimp, the most important factor is to spread the ice into the layers of shrimp so that each individual shrimp will be cooled by direct contact with the melting ice. Layers of warm shrimp without sufficient ice will delay the chilling of those in the middle and cause quality loss. Granular-type ice (neither too coarse or fine) is recommended for icing the shrimp. Coarse ice tend to bruise the tender shrimp and fine ice does not allow adequate drainage through the mass. (Ketchikan)

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ANALYSIS AND COMPOSITION: Composition and Cold-Storage Life of Fresh-Water

Fish: The proximate composition of 16 individual Columbia River smelt was determined. The data are presented in the following table:

Composition of Edible Portion of Columbia River Smelt (Thaleichthys pacificus)

Sample No.	Proximate Composition in Percent				Sample No.	Proximate Composition in Percent			
	Moisture	Oil	Protein	Ash		Moisture	Oil	Protein	Ash
1	79.2	6.25	14.3	1.27	9	79.6	8.98	14.5	1.23
2	81.2	5.10	15.0	0.96	10	81.1	5.38	14.6	1.37
3	81.0	6.98	13.2	1.12	11	79.9	5.82	14.5	1.37
4	79.1	5.62	15.3	1.18	12	79.4	7.71	14.4	1.28
5	80.9	6.70	14.1	1.16	13	77.7	5.48	15.3	1.30
6	80.8	8.79	14.3	1.27	14	78.4	5.19	15.3	1.33
7	76.5	5.53	14.4	1.25	15	81.3	4.59	15.0	1.29
8	79.9	5.57	15.1	1.40	16	77.2	6.27	14.6	1.21
					Average	79.6	6.25	14.6	1.25

These data show that the Columbia River smelt has a proximate composition different from that of any other species of fish examined. Previous data collected at the Seattle laboratory as well as data of other workers, indicated that the sum of moisture plus oil content of most fish was about 80 (percent). Very rarely was this total as high as 83. For the Columbia River smelt, the sum of the oil plus moisture contents averaged 85.8 (percent) with individual analyses as high as 89.6.

The protein content of the Columbia River smelt also showed considerable variation from the normal in other fish. The protein content of most species of fish ranges from 17 to 20 percent; however, the protein content of the Columbia River smelt averaged only 14.6 percent, with a low individual value of 13.2 percent.

BYPRODUCTS: Vitamin Content and Nutritive Value of Fishery Products: Vitamin B₁₂ assays of eight organs separated from the pilchard were carried out. The kidney has the highest vitamin B₁₂ content, with the liver ranking a poor second.

Item	Vitamin B ₁₂ Content
	Micrograms Per Gram (Wet Basis)
Liver	0.43
Stomach	0.044 to 0.191/
Gonads	0.23
Intestine	0.018 to 0.0931/
Kidney	1.48
Heart	0.35
Spleen	0.095
Pyloric caeca	0.08 to 0.291/

1/RANGE OF VALUES ARE REPORTED FOR THE STOMACH, INTESTINE, AND PYLORIC CAECA SINCE VARIATIONS WERE FOUND FOR EACH ANALYSIS. IT IS BELIEVED THAT THE VARIATION WAS CAUSED BY INHIBITORY SUBSTANCES PRESENT IN THESE ORGANS.

(Seattle)

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TECHNOLOGICAL PROGRAM MEETING NOT SCHEDULED FOR THIS YEAR: At this time of year the Technological Section of the Branch of Commercial Fisheries usually announces its annual meeting with representatives of the fishing industry. These meetings, which are held to formulate the research program for the succeeding fiscal year, normally take place during the last week in June. This year, however, the industry meeting will not be held.

A careful review of our present research program has indicated that it would not be feasible to alter or conclude by June 30, 1952, any of the major projects which are now in progress. Since these projects were initiated after consultation with members of industry and were considered the most vital of those suggested in June 1951, it seems logical that they be continued until they have been satisfactorily completed.

A meeting is definitely scheduled for next year (June 1953), for at that time many of the present projects will have been completed.

If one or more of the current projects are completed and research personnel and laboratory facilities become available before June 1953, work will be initiated immediately on one of the other projects which were suggested at the last meeting but which could not be included in the present program.

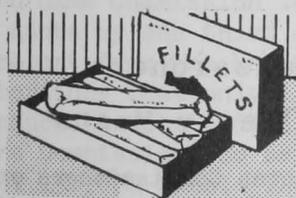
Research work on the current technological program as published in the November 1951 Supplement of Commercial Fisheries Review is proceeding according to plan. A summary report of the progress on the technological research of fiscal year ending June 30, 1952, will be published in the near future.



SALES POSSIBILITIES FOR FROZEN FISH INCREASE

Several railroad companies are now experimenting with pre-cooked frozen foods for diner use. The meals (from soup to dessert) are cooked and frozen in central kitchens and then put aboard the trains. As needed, they are thawed, heated, and served. The railroads have found this innovation so promising that they are now trying to expand its use to more extensive menus. Swordfish has been tried successfully. Undoubtedly more menus which included fish are being considered. This may be an opportunity for enterprising fish dealers to assist the railroads in developing this new idea.

The sale of frozen fish in wholesale quantities to home-freezer owners is a possibility worth exploring. Already there are approximately four million home freezers in use in the nation. Many owners want to buy frozen foods at quantity prices to place in their freezers. Some sellers of home



freezers are giving their customers lists of frozen-food distributors who sell frozen foods on this basis. Other home-freezer distributors sell their customers frozen foods at the same time that the home freezer is purchased. Frozen fish dealers who want to sell more fishery products in quantity to individuals should work closely with their local home-freezer distributors, and cater to home-freezer owners. In so doing, they will be tapping and expanding new markets for fishery products.

These sales possibilities for selling frozen fish indicate the ever-broadening market for frozen fishery products. Advantage should be taken of these opportunities in order to increase the national consumption of fish and shellfish.